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August 3, 2012

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VIA FAX AND EMAIL

Michael Berkoff
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590
FAX (312) 353-1263
berkoff.michael@epa.gov

*Re: Comments on behalf of USS Lead Refinery, Inc. regarding the July 2012
Proposed Plan for Operable Unit 1 of the U.S. Smelter and Lead Refinery
Superfund Site in East Chicago, Indiana*

Dear Mr. Berkoff:

On behalf of USS Lead Refinery, Inc. ("USS Lead"), we write to provide comments on the U.S. Environmental Protection Agency's ("EPA") Proposed Plan for Operable Unit 1 of the U.S. Smelter and Lead Refinery Superfund Site in East Chicago, Indiana (the "Site"). Please note that by submitting these comments, USS Lead does not admit to any responsibility or liability.

1. The USS Lead Property Should Be Evaluated For Use As A Disposal Site.

If EPA implements Alternative 4A or another approach that involves excavation of residential soils, it should consider utilizing the USS Lead property as a disposal site for the excavated, non-hazardous soils. This approach would reduce transportation and disposal costs, reduce safety risks associated with trucking impacted soils to a third-party landfill, and reduce trucking-related impacts to infrastructure (e.g., roads).

2. ATSDR's Public Health Assessment Report Does Not Support Excavating Residential Yards.

The Agency for Toxic Substances and Disease Registry's ("ATSDR") January 27, 2011 Public Health Assessment for the Site does not support excavating soil in

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residential yards. ATSDR concluded that the blood lead levels of young children in the West Calumet and Calumet communities to the north of the USS Lead Site are "consistent with the national average" and that these children "are no longer exposed to lead from any source." Public Health Assessment at 2, 7. ATSDR also concluded that "breathing air, drinking tap water or playing in soil around the USS Lead Site is not expected to harm people's health, as indicated by the declining blood lead levels in small children." *Id.* at 16. ATSDR's conclusions indicate that excavation of residential soils is not necessary to protect human health. Thus, Alternative 4A, by calling for excavation of soils that apparently do not present a risk, is neither necessary nor cost-effective, and could create the potential for unnecessary risks associated with the proposed removal action.

3. The Human Health Risk Assessment Does Not Support Excavating All Residential Soils With Lead Concentrations Above 400 mg/kg.

EPA's Human Health Risk Assessment concluded that residential properties with *average* lead concentrations in soil greater than 400 mg/kg may present potential risk. The Proposed Plan, however, establishes a Remedial Action Level (RAL) of 400 mg/kg for lead and it appears that EPA proposes to excavate *all* residential soils with lead concentrations above 400 mg/kg (to a depth of two feet), even if the average concentration for that yard is below 400 mg/kg. It is not necessary to excavate all soils with lead concentrations exceeding 400 mg/kg to achieve an average concentration of less than 400 mg/kg in a given yard. Yards with average concentrations below 400 mg/kg should not require excavation.

If EPA does not limit the scope of excavation to that required to achieve an average concentration of less than 400 mg/kg, then it should develop a risk-based remedial action level to address true "hot spot" locations, if any, within a yard that otherwise has an average lead concentration less than 400 mg/kg.

4. Alternative 4A Is Not Cost-Effective; Alternative 3 Or A Hybrid of Alternatives 3 and 4A Would Be More Appropriate.

Remedial Alternative 4A, which is selected in the Proposed Plan, is not cost effective because it is nearly 60% more expensive than Alternative 3, which would fully protect human health and the environment and comply with all ARARs. Alternative 3 would also require less extensive excavation, disturb less lead-contaminated soil, require less heavy truck traffic, and be completed in a shorter construction time than Alternative

4A. For all of these reasons, it also may be more acceptable to the community than Alternative 4A.¹

Furthermore, EPA rejected Alternative 3 based on potential implementability challenges that are speculative and were not fully evaluated. Specifically, EPA concluded that Alternative 3 would be "more difficult to implement" because "it requires more detailed remedial design plans to maintain safe grading for each of the contaminated yards." It appears that EPA rejected Alternative 3 because it would be difficult to develop a custom remedial design for each yard and it may not be practicable to re-grade some yards depending on the impacted area (e.g., adjacent to a sidewalk). Given that the cost of Alternative 3 is approximately \$10.7 million less than Alternative 4A, however, it appears that these engineering challenges do not translate to higher overall costs. Thus, the difficulty involved in preparing "more detailed remedial design plans" is warranted in light of the substantial cost savings even when the costs of preparing the more detailed design plans are taken into account.

As an alternative to selecting Alternative 3 outright, EPA could select a hybrid of Alternatives 3 and 4A. Under the hybrid remedy, Alternative 3 would be the default approach for each of the contaminated yards, but the Alternative 4A approach would be implemented instead at those yards for which re-grading would be impracticable from an engineering perspective or would otherwise be more costly than the excavation and backfilling that would be conducted under the Alternative 3 approach.

5. USS Lead's Finances.

As EPA Region 5 is aware, USS Lead ceased operations in 1985 and committed, at that time, its remaining funds and assets toward compliance with the RCRA Administrative Order on Consent. USS Lead generates no cash and has no source of funding. USS Lead's only remaining "asset" is its property, which is presently encumbered by a tax delinquency to Lake County in the approximate amount of \$1.9 million. EPA Region 5 acknowledged USS Lead's financial condition in a letter from Michael J. McClary to the undersigned, dated July 28, 2006, which stated in part as follows:

U.S. EPA has examined the financial documentation submitted by USS Lead, and determined that USS Lead appears to have limited financial ability to complete all of the RCRA and other remediation-related activities currently required or expected to be required for the

¹ EPA stated that Remedial Alternative 4A was selected in part because "community acceptance of Alternative 3 may be difficult to obtain." Proposed Plan at 13. This presumption is unfounded and at best premature because EPA has not yet received public comments.

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facility: i.e., RCRA corrective action under the AOC between U.S. EPA and USS Lead, post-closure activities for a Corrective Action Management Unit that may be required by the Indiana Department of Environmental Management (IDEM), and remediation activities in the East Chicago area currently required or expected to be required by the Superfund Program under CERCLA.

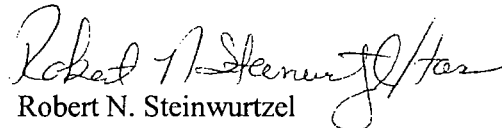
Accordingly, USS Lead does not have the financial ability to contribute to or participate in a response action for Operable Unit 1.

6. For further comments applicable to the Proposed Plan, please refer to the letter from the undersigned to Steven Kaiser, EPA, dated April 23, 2012, and the April 20, 2012 memorandum from Exponent attached thereto. The April 23 letter and April 20 memorandum are attached to this letter and the comments contained therein are hereby incorporated by reference. Please include these materials in the administrative record as comments submitted on behalf of USS Lead in response to EPA's Proposed Plan.

* * *

Please contact the undersigned if you wish to discuss these comments.

Sincerely,


Robert N. Steinwurtzel

Attachments

cc: Norm Johnson, USS Lead Refinery, Inc.

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April 23, 2012

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VIA E-MAIL

Steven P. Kaiser
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: *USS Lead Superfund Site, East Chicago, Indiana*

Dear Mr. Kaiser:

On behalf of USS Lead Refinery, Inc. ("USS Lead"), we write regarding your letter dated April 17, 2012, concerning the Region's intention to seek an exemption from review by the National Remedy Review Board ("NRRB").

Your letter was received at the close of the business day, April 17, 2012. In your letter, EPA Region 5 requests that USS Lead provide any responsive comments by close of business, April 20, 2012. Region 5 subsequently extended that deadline until close of business, April 23, 2012. Thus, this response is timely. Please note that by submitting this response, USS Lead does not admit to any responsibility or liability.

We appreciate the opportunity to address Region 5's intended action to seek an exemption from the NRRB and that it is standing EPA policy to provide PRPs (as well as communities) an opportunity to comment on exemption requests: "Regions should offer states, tribes, local governments, PRPs and local communities an opportunity to summarize in writing their opinion regarding the proposed exemption decision." <http://www.epa.gov/superfund/programs/nrrb/faqs.htm#4> However, in this instance, Region 5 has not provided a meaningful opportunity to comment because it has not made available data (1) supporting the proposed remedy, (2) the basis for the exemption request, and (3) even what are the actual terms of the proposed remedy. Therefore, USS Lead requests that Region 5 defer any decision to seek an exemption until it provides interested parties with additional information and provides those parties with sufficient time to review and comment on said information. In the event that Region 5 is unwilling to defer seeking an exemption from the NRRB until after providing interested parties with information about the proposed remedy and providing the parties with sufficient time to provide comments thereon, then USS Lead opposes seeking an exemption and requests that the proposed remedy be reviewed by the NRRB.

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The case law is clear that opportunity to comment without the basic underlying data upon which the proposed agency decision is based is illusory. U.S. v. Nova Scotia Food Products Corp., 568 F.2d 240 (2d Cir. 1977) ("To suppress meaningful comment by failure to disclose the basic data relied upon is akin to rejecting comment altogether."). USS Lead respectfully submits that Region 5 has not complied with the agency's policy quoted above, and reserves the right to submit further comments on the exemption request if and when the basic data underlying the requested exemption is made available to the Company.

The purpose of the NRRB is to promote cost-effective solutions and ensure regional consistency. OSRTI management has reiterated that more, not fewer, proposed remedies should be reviewed by the NRRB. Memorandum from Michael Cook to Superfund National Policy Manager, March 21, 2005, The estimated costs for the proposed USS Lead remedy are almost twice the target level in the 2005 Cook memo.

It must be noted that the Remedial Investigation and Feasibility Study ("RI/FS") referenced in your letter has not been made available to the public. Consequently, USS Lead (or, presumably, no other interested party) has any information on how Region 5 determined the proposed remedial action levels for the USS Lead site, including whether Region 5 performed a risk assessment as part of that determination. Your letter indicates that the proposed remedy constitutes excavation of soils that contain concentrations of lead in excess of 400 ppm. However, the EPA guidance provides that the 400 ppm criterion is a soils screening level for lead, not a cleanup level. Hence, confirmation of lead in soil in excess of 400 ppm requires further investigation, likely including a risk assessment, to develop a risk-based remedial action level that often results in the establishment of a cleanup level less stringent than the screening level of 400 ppm. That is, the 400 ppm should not be used as a "default" remedial action level. The appropriate remedy depends on a variety of factors, as described in the attached technical report prepared by Exponent entitled "Technical Considerations for Remediating Lead-Contaminated Soils".

The presence of arsenic can be attributable to many common sources such as pesticides or herbicides which may have been applied to the residential yards; however, Region 5 has not provided any information indicating whether it has determined the sources for the lead and arsenic. In addition, it isn't clear why Region 5 is proposing a remedial action level for arsenic since the remedy to achieve a performance standard for lead should address the presence of arsenic. The failure to provide additional information to address these issues and the lack of any opportunity for a meaningful public review process underscores why seeking an exemption from NRRB is premature.

Lastly, the limited information that is available demonstrates that Region 5 does not satisfy the criteria to secure an exemption from NRRB review. The EPA guidance on when an exemption from NRRB review is appropriate indicates that this type of exemption is appropriate for "certain remedies such as simple landfills or yard excavations."¹ The brief description in your letter of the plan Region 5 currently favors for the USS Lead site – including the

¹ CSTAG and NRRB Operational Changes (revised October 28, 2011), available at http://www.epa.gov/oswer/docs/ici/cstag_nrr_operational_changes.pdf.

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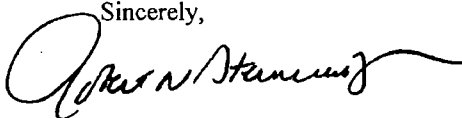
excavation, backfilling, grading, seeding, and watering of 680 properties at an estimated cost of \$44 million – indicates that Region 5 is considering a remedy that far exceeds the scope and magnitude of the “simple...yard excavations” contemplated by the EPA as appropriate for exemption from NRRB review. Moreover, as outlined in the attached technical appendix, there are many discretionary decisions about how to apply EPA guidance at lead sites, and thus the remedies adopted by various regions have varied widely. The proposal for the USS Lead site, therefore, represents the type of high cost remedy that should be reviewed by the NRRB.

The only justification provided in Region 5’s April 17 letter for seeking an exemption is that the remedy is “consistent with the procedures outlined in Superfund Lead Contaminated Sites Residential Handbook (August 2003).” But there are many other remedies that would be consistent with this guidance, and in accordance with its mandate, the NRRB should review the Region exercise of discretion to determine if it is cost-effective and consistent with actions by other Regions. Based on the very limited information provided, it does not appear to be either.

In sum, Region 5 has not provided USS Lead with sufficient information or adequate time to provide the agency with substantive comments on the proposal to seek an exemption from review by the NRRB. In the absence of providing this information, Region 5 should defer any action to seek an exemption from the Board. Deferral is appropriate given the magnitude and scope of the proposed remedy, and the limited public funds available to conduct such an expensive remedy. Providing the information supporting the proposed remedy will allow interested parties to assess whether the proposed remedy is technically justifiable, legally defensible, and constitutes an appropriate use of Superfund monies. In the event Region 5 elects to proceed forward with the proposed exemption notwithstanding these demonstrated deficiencies, then USS Lead opposes seeking an exemption.

Please contact the undersigned if you wish to discuss these comments.

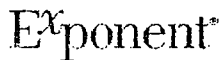
Sincerely,



Robert N. Steinwurtzel

Attachment

cc: Norm Johnson, USS Lead Refinery, Inc.



EXTERNAL MEMORANDUM

TO: Robert Steinwurtzel, Counsel representing USS Lead
FROM: Charles Menzie, Ph.D. *Ch. A. Menzie*
DATE: April 20, 2012
PROJECT: USS Lead Site
SUBJECT: Technical Considerations for Remediating Lead-Contaminated Soils

On behalf of USS Lead Refinery Inc. (USS Lead), Exponent was asked to review the April 17, 2012, letter from Steven Kaiser of EPA Region 5 (EPA letter) to Robert Steinwurtzel, counsel representing USS Lead. The EPA letter indicates that Region V currently favors a plan that calls for the excavation and offsite disposal of soils from, properties that contain concentrations of lead in excess of 400 ppm or arsenic of 26.4 ppm within the top 2 ft. No information is provided regarding the procedure to stepping out sampling from hot spots, or whether the proposal is to remediate an entire lot if a single sample exceeds 400 ppm. Excavated areas will be backfilled with clean soil, graded, seeded, and watered. EPA estimates that work will be required at 680 properties and that the project cost will be approximately \$43.9 million. EPA considers the planned remedial approach to be "simple and straightforward" and consistent with the *Superfund Lead-Contaminated Residential Sites Handbook* (U.S. EPA 2003) (Residential Lead Handbook). The handbook was designed to provide consistency across regions for addressing lead contamination issues for Superfund sites at which residential properties have elevated levels of lead.

The Residential Lead Handbook when applied to a large site with numerous properties is not "straightforward and simple" and requires great attention to detail and process. However, based on the premise that remediation of a large lead site with an estimated cost of almost \$44 million dollars is "simple and straightforward," EPA Region 5 intends to request a waiver from review of the remedial plan by the National Remedy Review Board (the Board). In this memorandum, we comment on several aspects of applying the Residential Lead Handbook to residential properties and why we think the remedy proposed by EPA Region 5 should be reviewed by the Board. We also draw upon experience with lead remediation at other superfund sites around the country. Our comments address:

- Land-use considerations
- The contention that the Residential Lead Handbook is easily applied and straightforward
- Reliability of sampling strategies and statistical analyses
- Consideration of the appropriate soil-lead target clean-up level

Technical Considerations for Remediating Lead-Contaminated Soils

- Consideration of bioavailability
- Consideration of soil depth for remediation
- Consideration of alternative remedial options.

Land-Use Considerations

The Residential Lead Handbook is intended to be applied to residential properties as defined within the handbook. It is unclear from the letter whether EPA Region 5 has distinguished among the various types of land use included in the 680 properties. The proper application of guidance to properties is a factor that the Board should consider in reviewing the proposed remedial plan.

Even for residential properties, the Residential Lead Handbook does not treat all of these properties the same. Differences among groups of properties will involve different types of risk assessment and risk management decisions. The Residential Lead Handbook suggests a tiered approach, and this requires necessary technical and analytical information, along with professional judgment. The handbook also recognizes that different remedial approaches may be warranted depending on the presence or absence of sensitive populations (primarily very young children). These types of judgments can be very important and fall into the purview of the Board to review with respect to their appropriateness.

Importantly, Superfund does not specify a simple soil value, such as 400 ppm, for clean-up actions at lead-contaminated sites. Instead, the Residential Lead Handbook calls using the IEUBK model as the means for assessing risks and guiding remediation. Use of this model allows the assessors and managers to incorporate site-specific information, including information on bioavailability where that makes sense. The 400-ppm number is generally considered to be a residential screening level.

The Contention that the Residential Lead Handbook is Easily Applied and Straightforward

EPA Region 5 suggests that the Board need not review the \$43.9 million proposed remedy, because the approach to assessment is simple and straightforward. The purpose of the Residential Lead Handbook was not to establish a simplified approach; rather, it developed to help ensure consistency among regions. To that end, the Residential Lead Handbook provides considerable detail on sampling, analysis, and evaluation procedures. Left open are the types of judgments that assessors must make, as well as the manner in which data are to be used to inform decisions. A portion of the process is captured in complex flow charts that are included in Attachment A of the memorandum. These do not reveal a "simple" process but instead indicate that important technical policy decisions must be made throughout the process. These

Technical Considerations for Remediating Lead-Contaminated Soils are the types of decisions that can have large implications in regard to the cost-effectiveness of the remedy. For large remediation projects, such as the \$43.9 million proposed remedy, the discretionary elements of the proposed remedy by EPA Region 5 for the USS Lead Site warrants careful review by the Board. If the starting assumptions concerning what constitutes a health protective remediation are flawed (i.e., need of a yard-wide target of 2 feet of soil excavation and cover) or steps have not been carefully followed or have been "skipped" in the interest of simplification, the resulting remedy could be a misdirected remedial program that is not cost-effective.

The Residential Lead Handbook also includes some disclaimers and precautionary statements that should be considered:

Some of the statutory provisions described in this document contain legally binding requirements. However, this document does not substitute for those provisions or regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances. Any decisions regarding a particular remedy selection will be made based on the statute and regulations, and EPA decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate.

Interested parties are free to raise questions and objections about the substance of this guidance and the appropriateness of the application of this guidance to a particular situation, and the Agency welcomes public input on this document at any time. EPA may change this guidance in the future.

Reliability of Sampling Strategies and Statistical Analyses

Sampling strategy and statistical analyses of data are among the most important aspects of evaluating lead exposures. The Residential Lead Handbook provides the detail on how this should be accomplished. Of particular import is the concept of estimating **the average exposure**. This average is not the same as a isolated soil sample with lead above a certain number (e.g., 400 or 1,200 mg/kg). Instead, it needs to be derived through appropriate stratified and composite sampling. Unfortunately, Region V has provided no details regarding its proposed sampling procedures. If that sampling is not executed properly, the rest of the risk assessment will be incorrect, and risk management decisions may not be appropriate. Because of the importance of sampling strategy, statistical analysis, and exposure estimates, it is important for the Board to examine the reliability of the approach taken by EPA Region 5. The reliability

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and cost-effectiveness of the remedy will depend on the reliability of the underlying sampling program.

To illustrate the importance of proper sampling, consider the following from the Residential Lead Handbook. The handbook recommends that, when sampling residential lots with a total surface area less than 5,000 square feet (a typical urban lot size), five-point composite samples should be collected, at a minimum, from each of the following locations: the front yard, the back yard, and the side yard (if the size of the latter is substantial). The composites from the front, back, and side (if needed) yards should be equally spaced within the respective portion of the yard, and should be outside of the drip zone and away from influences of any other painted surfaces. Composites should consist of aliquots collected from the same depth interval. For residential lots with a total surface area greater than 5,000 square feet, the Residential Lead Handbook recommends that the property be divided into four quadrants of roughly equal surface area. The two quadrants in the front yard should encompass one-half of the side yard; likewise for the two quadrants in the back yard. One five-point composite of aliquots collected at equal spacing and from the same depth interval should be obtained from each quadrant. Each aliquot should be collected away from influences of the drip zone and any other painted surfaces. The stratification and averaging recommended by the Residential Lead Handbook is key to risk assessment and risk management, and is an important technical aspect of the remedy that the Board should review. **It is essential that the sampling be capable of supporting estimates of the average exposures for particular areas, and that single sampling points not be used for judging exposure.**

Based on our experience with lead-contaminated properties, the stratified approach described in the Residential Lead Handbook is the norm. A stratified approach allows for a more focused identification of areas that warrant remediation.

Consideration of the appropriate soil-lead target clean-up level

Within the Residential Lead Handbook it states...

In summary, there is no national clean-up standard for lead in residential soil on a Superfund site; however, there is a consistent process by which residential soil lead clean-up levels are selected. One step is to gather site-specific data as recommended in Section 4 of this Handbook and review other guidance on the use of the IEUBK Model (EPA, 1994b; TRW web site: <http://www.epa.gov/superfund/programs/lead/ieubk.htm>).

Our experience at lead-contaminated Superfund sites is that the IEUBK model is used when sites are large and when there is the potential for exposure of young children. While 400 ppm serves as a useful screening level, site-specific conditions may lead to other target values.

Being that there is no national clean-up standard for lead in residential soil on a Superfund site, it would be inaccurate to assume that a clean-up level of 400 mg/kg is a bright line that needs to

Technical Considerations for Remediating Lead-Contaminated Soils
be achieved to be health protective in all cases. If Region V is indeed taking that position at this site (as appears to be the case from Mr Kaiser's brief letter), there could be important implications for regional consistency elsewhere that the Board should consider. As highlighted above only when proposed clean-up levels are outside the range of 400- 1200 mg/kg, is special review needed. In essence, this indicates that soil-lead levels upwards of 1,200 mg/kg can be considered health protective depending upon yard specific considerations. For these reasons, it would be appropriate to revisit the target clean-up value of 400 mg/kg proposed by EPA in their letter.

Consideration of Bioavailability

Explicit consideration of bioavailability becomes especially important when sites are large and involve many properties. The potential for community-wide exposures is the reason why EPA developed a means for assessing site-specific bioavailability. Lead and arsenic are two metals for which EPA, at a national level, has developed approaches for assessing bioavailability. This important consideration influences exposure and can lead to remedial outcomes that differ from the selection of off-the-shelf clean-up values. At sites where bioavailability is reduced, lead target levels can be considerably higher than the 400 ppm screening level. In particular, areas that are used for recreational purposes in communities may be handled very differently than residential yards.

Lead in soil is known to vary considerably in bioavailability. In 2007, EPA published a report of the relative oral bioavailability (RBA) of lead in soils for 19 soils from 10 contaminated sites. The RBA values in this report ranged from 6% to 90%, and included several (seven or more) soils impacted by smelter waste. Other studies indicate similar considerations for arsenic including an RBA of 18% that was applied to soils impacted by the smelter in Anaconda, Montana. The body of information regarding the bioavailability of lead and arsenic illustrates that several site- and source-specific factors can have a significant effect on the potential for exposures (human or ecological) from contaminated soils, and that ignoring these factors can result in inaccurate assessment of potential exposures and risks. In a memorandum to Superfund policy managers, James Woolford, then Director of the Office of Superfund Remediation and Technology Innovation, instructed that "Bioavailability can be a critical factor in determining the potential uptake of contaminants by receptors and an important consideration in determining potential threats to human health that may be posed by contaminated sites (Woolford 2007). Additionally, it's important to point out that assessing the RBA of lead from soils is simple to accomplish, now that EPA has issued national guidance and an analytical method for generating data (U.S. EPA 2007).

The Residential Lead Handbook allows for the consideration of site-specific evaluation of bioavailability, but it is unclear whether EPA Region 5 completed such an evaluation. Instead,

Technical Considerations for Remediating Lead-Contaminated Soils
the letter from EPA implies that the 400-mg/kg screening value for residential soils was simply selected as the clean-up value for all soils.

The information on site-specific bioavailability is incorporated into EPA's IEUBK model as an input value. The Residential Lead Handbook indicates that such model inputs should be changed only when defensible, site-specific information that is specifically applicable to the parameters is collected. Moreover, these changes should also ensure that model outputs are protective of future residents. Examples of such information are dust lead concentration, drinking-water concentration, bioavailability data (e.g., *in vivo* pig studies), and soil-to-dust ratio. The predictive capacity of the IEUBK model depends on the representativeness of the inputs. The Residential Lead Handbook provides further guidance on how this aspect of the exposure assessment should be conducted.

Consideration of Soil Depth for Remediation

Soil depth is a key factor for risk assessment and for remediation. The Letter from EPA Region 5 implies that all soils on any property with a single "hit" above 400 ppm will be remediated to a depth of 24 inches. Based on experience with other lead-contaminated sites, this is a deeper remediation depth than what is typically selected to address soil exposures when the source of lead contamination is at the surface. A two-foot deep remediation of yards with subsequent backfill is likely at variance with guidance provided in the Residential Lead Handbook. Lead-contaminated sites with which we have experience have involved remediation methods that are specific to the contaminated soil depth interval. In many cases, this can be very shallow. Because a two-foot excavation with backfill would be considerably more expensive than standard approaches used for lead sites, this is an aspect of the proposed remedial plan that should be reviewed by the Board for cost effectiveness. Moreover, two-foot excavation depth would greatly increase the volume of soils to be disposed off-site, particularly if the Region intends to dispose of all soils as hazardous waste based on a single reading above 400 ppm. Again, insufficient detail is provided in the Kaiser letter, but the implications for regional consistency could be very substantial if the Board signs off on this approach as non-controversial, and indeed required by the Handbook, as Region V apparently maintains.

We examine the issue of soil depth in two parts. First, we discuss sampling of soils and estimates of exposure for risk assessment purposes. Second, we discuss implications for risk management.

The Residential Lead Handbook offers the following considerations for sampling of soils with respect to soil depth and data utilization:

- Composite samples should be collected at 6-inch depth intervals (i.e., 0–6 inches, 6–12 inches, 12–18 inches, and 18–24 inches).

Technical Considerations for Remediating Lead-Contaminated Soils

- Five-point composite surface soil samples should be collected from 0 to 1 inch for human health risk assessment purposes (U.S. EPA 1989, 1996c).
- The focus on near-surface sampling is important at smelter sites, because the 0–1 inch horizon may be far more contaminated than the 1–6 inch. This is due to the atmospheric depositional nature of the lead source, and it highlights the importance of shallow rather than deep soils at such sites.

The Residential Lead Handbook indicates that collection of samples from specified depth intervals serves two primary purposes: risk assessment and remedial decision making.

The vertical extent of lead (or arsenic) contamination at the USS Lead Site is a critical aspect of remedial design. The Letter from EPA suggests that 24 inches is the depth to which remediation is planned. However, as indicated above, lead contamination that arrives from an atmospheric source is found largely in the most surface soil levels (i.e., the upper few inches). Removing soils to 24 inches appears to be inconsistent with prevailing guidance and practice, unless these deeper layers are in fact contaminated to levels that exceed risk-based concerns. As indicated in the Residential Lead Handbook, and based on experience elsewhere, it is more common to remediate the upper layers that exhibit contamination. Commonly, soil remediation depths for surface soil contamination can extend to 12 inches of soil depth and this is the case for a number of superfund sites around the country. In addition to excavation to depth, clean soil should be used to establish an adequate barrier from contaminated soil in a residential yard, for the protection of human health. In accordance with the Residential Lead Handbook, cover soil can either be placed after excavation as backfill or placed on top of the contaminated yard soil. The rationale for establishing a minimum cover thickness of 12 inches is that the top 12 inches of soil in a residential yard can be considered to be available for direct human contact. The Residential Lead Handbook notes that, with the exception of gardening, the typical activities of children and adults on residential properties do not extend below a 12-inch depth. Thus, placement of a barrier of at least 12 inches of clean soil will generally prevent direct human contact with and exposure to contaminated soil left at depth.

Consideration of Alternative Remedial Options

It is unclear from the EPA letter that alternatives other than excavation of soil and back-filling were considered. As noted above, covering contaminated areas with clean soil can be a cost-effective remedy. In addition, presuming most of the site-related lead reflects atmospheric deposition, it is expected that most contamination for this metal would be at the surface (i.e., well within the top few inches of soil). For this reason, it is presumptuous to assume that excavation of 24 in of soil is required to provide a health protective remedy. Rather a 12" soil cover should be considered, as it will be health protective for the majority of areas requiring remedial action.

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Excavation and backfilling with a cover are not the only ways to address exposures in lead-contaminated soils. There has been continued demonstration and project work involving amending the soil with phosphorus or high iron biosolids composts. A project is currently underway in the South Prescott community of Oakland, California. The remediation with mineral amendments is being carried out adjacent to a superfund site. The use of amendments can be especially attractive for areas where there is a desire to reduce exposure to lead in a cost-effective manner that is not disruptive to the community

References

U.S. EPA. 2007. Guidance for evaluating the oral bioavailability of metals in soils for use in human health risk assessment. OSWER 9285.7-80. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 2003. Superfund lead-contaminated residential sites handbook. OSWER 9285.7-50. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

Woolford, J.E. 2007. Guidance for evaluating the oral bioavailability of metals in soils for use in human health risk assessment. Memo to Superfund National Policy Managers, Regions 1-10, Regional Toxics Integration Coordinators (RTICS), Regions 1-10. OSWER 9285.7-80. U.S. Environmental Protection Agency, Washington, DC.

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ATTACHMENT A

**FIGURES ILLUSTRATING THE ASSESSMENT AND REMEDIAL PROCESS FOR
LEAD-CONTAMINATED SOILS**

FROM U.S. EPA (2003)

**Note: The process is intended to provide consistency. However, that does not make this
process either “simple” or “straightforward.”**

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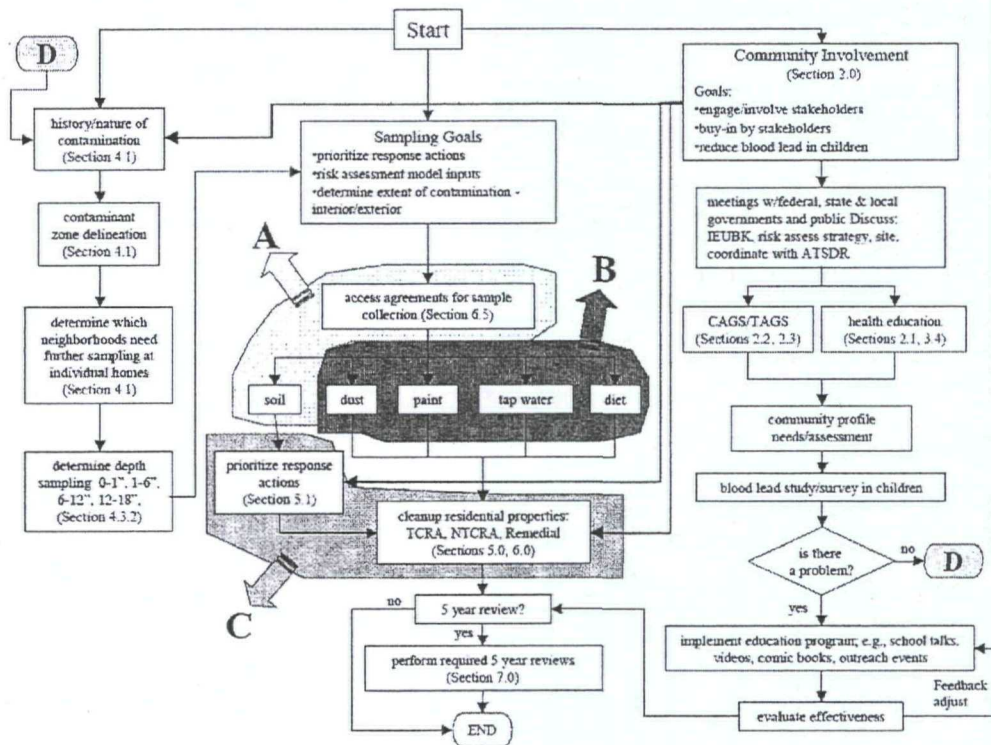
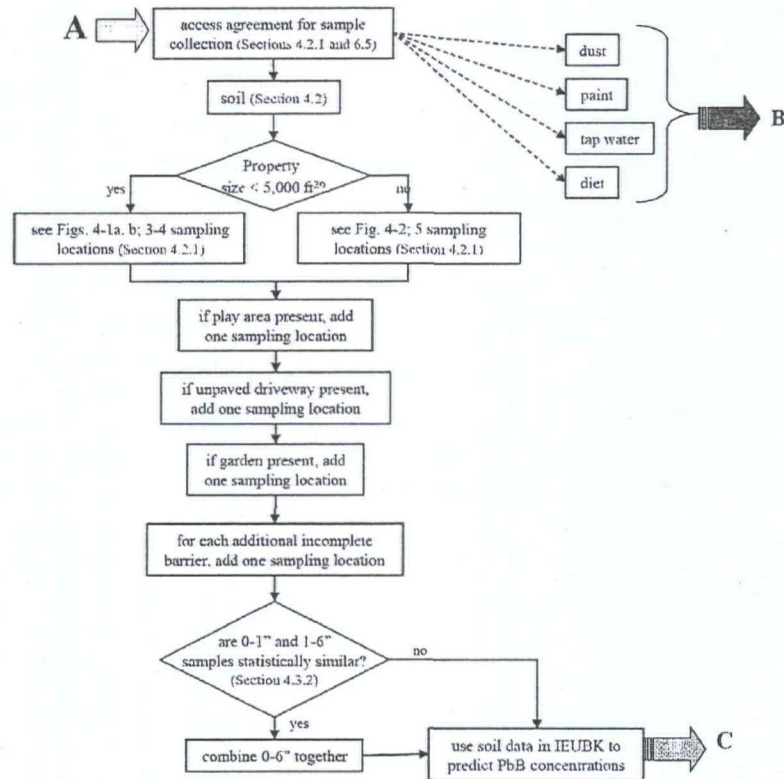
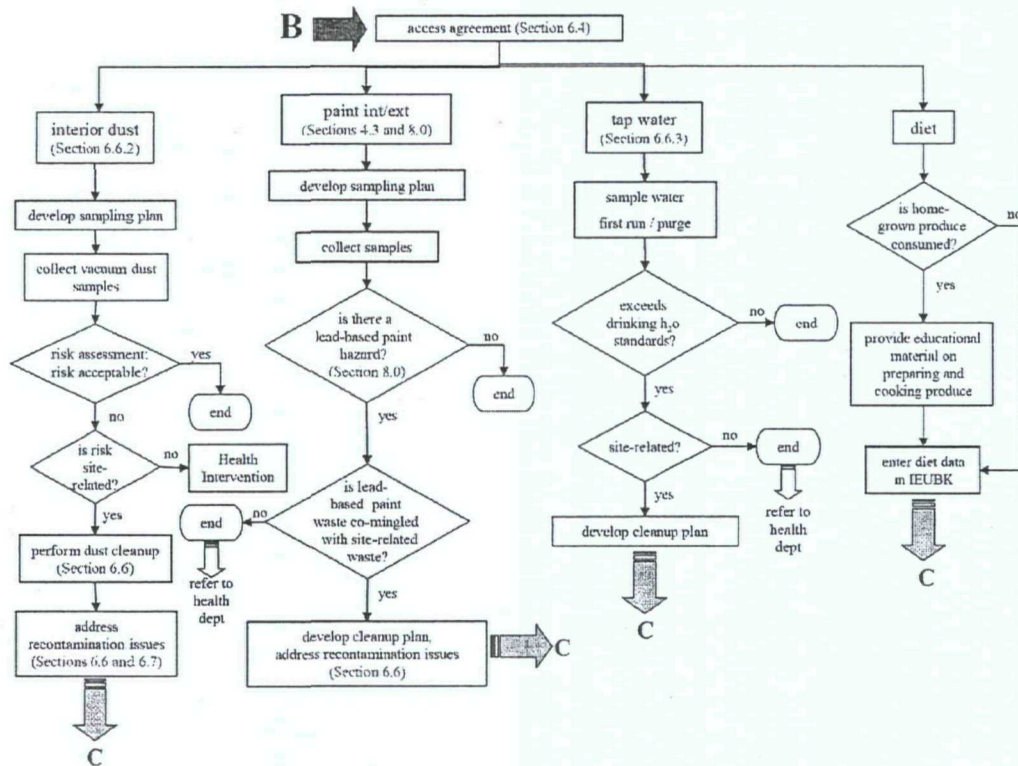


Figure 5-1. Recommended clean-up process for lead-contaminated residential sites. Refer to Figure 1-1 for an overview of the process. The shaded portions of the figure, labeled A-C, are expanded on the second through the fourth pages of the flowchart.

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